HEAT-CONDUCTIVE STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to heat-dissipative technology, and more particularly, to a heat-conductive structure.

2. Description of the Related Art

A conventional heat-conductive plate is made of metal and includes a plurality of fins mounted thereon for enlarging the heat-dissipative area to attain preferable heat-dissipative effect.

Referring to FIG. 6, heat pipes 61 are inserted inside fins 63 to enhance the heat conduction among the fins to further attain preferable heat-dissipative effect. However, the above-mentioned structure merely rapidly transmits the heat between the fins but fails to effectively transmit the heat out of a heat-conductive plate 60.

There are two conventional solutions, as depicted below, to improve the drawbacks of the aforementioned conventional structure by mounting the heat pipes closely on the heat-conductive plate and under the fins.

1. The heat pipes are closely mounted on a top side of the heat-conductive plate and inserted through bottom sides of the fins.

2. The heat-conductive plate further includes a channel for receiving the heat pipes; meanwhile, thickness of the heat-conductive plate has to be increased, and the heat pipes have to be received in the channel with their cross-sections being oblate. However, the part corresponding to the inner bottom periphery of such heat-conductive plate cannot be too thin, and otherwise, the bottom side of the heat-conductive plate will be deformed to be uneven. However, if that part of the plate is too thick, the

heat-conductive plate will have ineffective heat conduction.

SUMMARY OF THE INVENTION

The primary objective of the present invention is to provide an improved heat-conductive structure in which a heat-conductive plate is preferably strengthened and is preferably thin to attain preferable heat-conductive effect.

The secondary objective of the present invention is to provide an improved heat-conductive structure that has better heat-dissipative effect than prior art.

The foregoing objectives of the present invention are attained by the improved heat-conductive structure that includes a heat-conductive plate. The heat-conductive plate has a base plate, two support members extending upwards respectively from bilateral sides of the base plate for a predetermined breadth and height, a channel formed between the base plate and the two support members, two wing portions horizontally extending outwards respectively from the two support members, and a recession formed at a midsection of a bottom side of the base plate. The base plate is relatively thin and of low thermal resistance at the midsection thereof corresponding to the recession to cause effective and rapid heat conduction.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a first preferred embodiment of the present invention;

FIG. 2 is a sectional view taken from a line 2-2 indicated in FIG. 1;

FIG. 3 is a perspective view of a second preferred embodiment of the present invention;

FIG. 4 is a perspective view of a third preferred embodiment of the present

invention;

FIG. 5 is a perspective view of a fourth preferred embodiment of the present invention; and

FIG. 6 shows a prior art.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 1 and 2, a heat-conductive structure 10 constructed according to a first preferred embodiment of the present invention includes a heat-conductive plate 11.

The heat-conductive plate 11 is composed of a base plate 12, two support members 14, a channel 16, two wing portions 18, and a recession 19. The two support members 14 respectively extend upwards from bilateral sides of the base plate 12 for a predetermined breadth and height. The channel 16 is formed between the base plate 12 and the two support members 14. The two wing portions 18 horizontally extend outwards respectively from the two support members 14 and each are positioned higher than the base plate 12. The recession 19 is formed at a midsection of a bottom side of the base plate 12 for contacting heating elements (not shown).

Hence, the recession 19 enables the midsection of the base plate 12 to be relatively thin, such that the base plate 12 has preferably low thermal resistance to cause effective and rapid heat conduction.

Further, the bilateral sides of the base plate 12 in proximity of the recession 19, i.e. the thicker sections than the midsection of the base plate 12, together with the two wing portions 18 positioned at another bilateral sides of the recession 19 form a frame-like structure around the recession 19 to further support the midsection of the base plate 12, such that the midsection of the base plate 12 can be preferably thin to

cause no deformation itself, even in the thickness of less than 1 mm, to have lower thermal resistance to further cause preferable heat-conductive effect.

Moreover, the two support members 14 can transmit the heat from the base plate 12 to the two wing portions 18 to be helpful to the heat-dissipation.

Referring to FIG. 3, a heat-dissipative structure 30 constructed according to a second embodiment of the present invention includes the heat-conductive structure 10 of the first preferred embodiment, at least one heat pipe 31, embodied as three heat pipes, and a plurality of fins 33.

The three heat pipes 31 are disposed in the channel 16 of the heat-conductive plate 11 and mounted closely on a top side of the base plate 12.

The fins 33 are mounted upright on the heat-conductive structure 10 and the heat pipes 31 and over the channel 16 and fixedly mounted on surfaces of the heat pipes 31 and top sides of the wing portions 18 at bottom sides thereof.

When the heat-conductive structure 30 is in use, the heat-conductive structure 10 is relatively thin at the midsection of the base plate 12 corresponding to the recession (not shown) to have preferably low thermal resistance to further rapidly transmit the heat generated by the heating elements (not shown) from the bottom side up to the top side of the base plate 12 and then to rapidly transmit the heat through the heat pipes 31 to the fins 33, thereby causing better heat-dissipative effect than the prior art.

Referring to FIG. 4, the heat-dissipative structure 40 constructed according to a third embodiment of the present invention is different from the second embodiment; the difference lies in that each of the heat pipes 41 further has an end extending outwards and upwards and through the fins 43.

Referring to FIG. 5, the heat-dissipative structure 50 constructed according to a fourth embodiment of the present invention is different from the aforementioned

preferred embodiments and further includes a top plate 55 disposed on the fins 53. Further, each of the heat pipes 51 extends outwards and upwards and through the top plate 55. The heat can be transmitted from the heat-conductive structure 10 through the heat pipes 51 up to the top plate 55; meanwhile, the temperatures of the top plate 55 and the heat-conductive structure 10 are the same; and further can be dissipated outside through the fins 53.

In conclusion, the relatively thick parts of the base plate 12, around the recession 19, together with the wing portions 18 form the frame-like support structure to allow the midsection of the base plate 12, above the recession 19, to be thin without deformation, thereby reducing the thermal resistance and incurring preferably effective heat conduction.